

AN ANALYSIS OF  
NATIONAL SEMICONDUCTOR CORPORATION'S  
ADVANCED SYSTEMS DIVISION

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Prepared For:  
HITACHI AMERICA, LTD.

JULY 1980

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# AN ANALYSIS OF NATIONAL SEMICONDUCTOR CORPORATION'S ADVANCED SYSTEMS DIVISION

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# AN ANALYSIS OF NATIONAL SEMICONDUCTOR CORPORATION'S ADVANCED SYSTEMS DIVISION

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**AN ANALYSIS OF  
NATIONAL SEMICONDUCTOR CORPORATION'S  
ADVANCED SYSTEMS DIVISION**

**ABSTRACT**

A study which describes the organization for the sales and technical forces of the National Advanced Systems Division of National Semiconductor Corporation. Information derived through in-depth interviews evaluates the business plans for this group. In addition, user attitudes are analyzed concerning the use of Hitachi and National systems as marketed previously by Intel and currently by NAS.

Y-HIT  
July 1980

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## I INTRODUCTION



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## I INTRODUCTION

- The objective of this study was to determine the long-range prospects for National Advanced Systems as a sales and service distributor for Hitachi computer products in the U.S. Emphasis was placed on:
  - User attitudes towards the equipment installed and maintained by NAS.
  - Evaluation of the installed base as a foundation for market expansion.
  - Evaluation of NAS management strengths and weaknesses.
  - Evaluation of the product, marketing, and business strategies of NAS.
  - Rumors and other indicators of how serious National is about continuing in the computer products business.
  - Financial strength of NAS.
- Chapter II presents an overview of the details presented in later chapters.
  - Conclusions are drawn on major issues supported by details presented in the entire study.
  - Recommendations are presented in Chapter II.



- Chapter III is a presentation of the findings from on-site interviews with key persons presently or recently associated with Itel or NAS.
- Chapter IV presents the analysis of the survey of 22 users of NAS and Hitachi systems.

(For the purposes of this study, NAS refers to all installed National Advanced Systems mainframes, including Hitachi mainframes. National refers to only those mainframes actually manufactured by NAS.)

## II EXECUTIVE SUMMARY, CONCLUSIONS AND RECOMMENDATIONS





## II EXECUTIVE SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

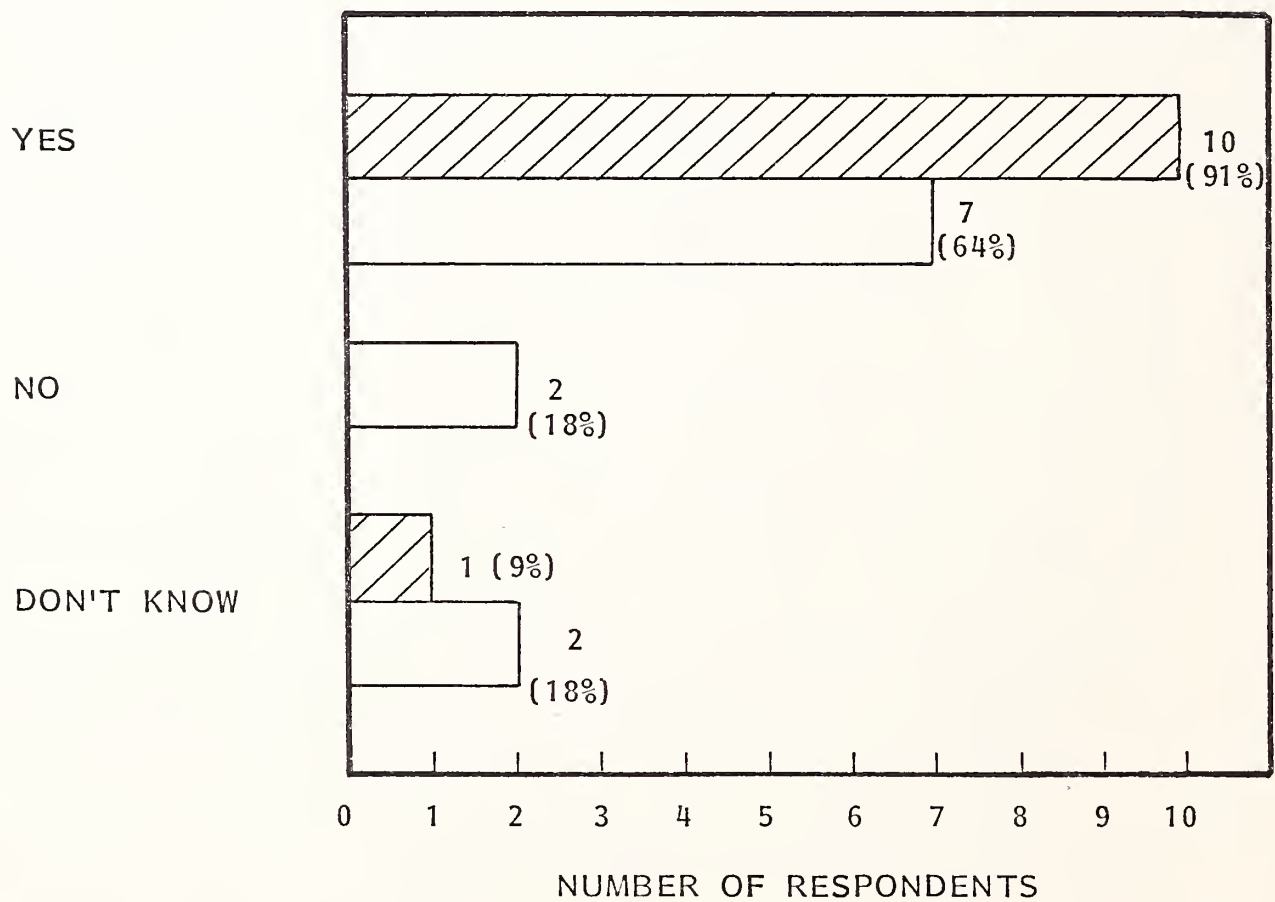
### A. SUMMARY OF FINDINGS

#### I. USER-INSTALLED BASE

- Installed equipment base is well established.
  - Users have high regard for NAS equipment, more enthusiasm for Hitachi equipment, but both receive good marks.
  - The field sales and service personnel enjoy a good image with users.
  - Of the installed equipment, only ISS disk drives received consistently low remarks.
- User satisfaction is exhibited by the fact that 77% of the users responded that they would look to NAS for upgrades, as shown in Exhibit II-1. Hitachi products enjoy a better reputation than those manufactured by National.
  - Ninety-one percent of Hitachi users will look to NAS for repeat business.
  - Sixty-four percent of the users of National systems will look favorably on the prospects of upgrading with equipment sold by NAS.

EXHIBIT II-1

USER RESPONDENTS' ATTITUDE TOWARDS THE  
UPGRADING OF THEIR INSTALLED  
BASE TO INCLUDE FUTURE ENHANCEMENTS  
AS ANNOUNCED BY NAS



- Only two of 11 respondents using National systems said that they would not upgrade with NAS.
- A sample of 152 domestic sites using NAS mainframes was surveyed for potential upgrade business.
  - The largest concentration is in the eastern part of the U.S., as shown in Exhibit II-2.
    - Seven million dollars in monthly rent is paid in the eastern states for all mainframes installed in the 71 sites using NAS mainframes.
    - In the eastern states, 22 sites with IBM systems are direct targets for replacement within the current installed base.
  - Of the 335 mainframes installed in 152 domestic sites, 56% are NAS systems with 44% representing prospects for replacement by NAS.
  - IBM mainframes are installed in 46 of the 152 sites (30%), representing direct targets for plug compatible mainframes.
  - Over \$14 million is paid in monthly rentals for mainframes in the 152 domestic sites surveyed, as shown in Exhibit II-2.
  - The domestic installed base appears very stable with over 60% of the systems installed in commercial and industrial sites, as shown in Exhibit II-3.
    - Only 18% of the systems are installed in relatively high credit risk service bureaus.
    - Most of the systems installed in government locations are purchased.



## EXHIBIT II-2

## GEOGRAPHIC DISTRIBUTION OF SYSTEMS

REGION	NUMBER OF SITES	NAS SYSTEMS	TOTAL SYSTEMS	SITES WITH IBM MAINFRAMES	MONTHLY RENT PAID FOR MAINFRAMES
EAST	71	87	166	22	\$ 7,163,493
CENTRAL	55	68	113	16	4,413,383
WEST	26	32	56	8	3,024,364
TOTAL	152	187	335	46	\$14,601,240

SAMPLE = 152 DOMESTIC SITES

# EXHIBIT II-3

## DISTRIBUTION OF SYSTEMS BY GOVERNMENT /NON-GOVERNMENT

DISTRIBUTION	NATIONAL SYSTEMS		HITACHI SYSTEMS	
	NUMBER INSTALLED	PERCENT OF TOTAL	NUMBER INSTALLED	PERCENT OF TOTAL
FEDERAL GOVERNMENT	13	9%	2	5%
STATE AND LOCAL GOVERNMENT	19	13	3	8
SERVICE BUREAUS	27	18	7	18
ALL OTHERS	90	60	26	68
TOTALS	149	100%	38	100%

SAMPLE = 152 DOMESTIC LOCATIONS

- Twenty-seven of the 187 systems installed at the surveyed sites (14%) were installed since the NAS takeover last October, as shown in Exhibit II-4.
  - . A greater potential for add-on memory sales exists with the National systems than with the Hitachi-installed base.
  - . A healthy potential for upgrades to larger Hitachi systems or to the MP or AP versions of the AS/6 appears to exist.

## 2. NAS MANAGEMENT

- Top management at NAS is perceived by industry executives, internal and external to NAS and Intel, as being well-qualified within the high volume and highly competitive semiconductor and consumer products industry.
- NAS top management is too heavily influenced by the parent company's traditional directions in the semiconductor business and is, therefore, weak in the computer products field.
- A "matrix-management" effect is imposed by NSC on functional executives within NAS which creates confusion and conflicting loyalties.
- NAS does not have a strong leader with a computer products background who can command the respect and autonomy required for serious, long-term commitment to the computer products business.
- Key middle management personnel have left and others expect to leave by the end of 1980 if more visibility of long-term commitment and autonomy of NAS is not evident by then.

## 3. NAS STRATEGIES

- National is currently wrapping up early strategies formed in 1979.



## EXHIBIT II-4

## SYSTEMS PROFILE OF 152 DOMESTIC SITES SAMPLED

MODEL	NUMBER INSTALLED	MAIN MEMORY	AVERAGE MEMORY	INSTALLED SINCE 10/1/79
AS/3	20	344MB	2.3MB	3
AS/4	24			-
AS/5	89			12
7031	16	182MB	4.8MB	4
AS/6	38			8
TOTALS	187			27

- To salvage the inventory of advanced systems in Intel warehouses.
- To assume control of Intel sales and service without liabilities in order to achieve the first objective (above).
- To control expenses and break even by FY 1981 on all advanced systems operations; engineering, manufacturing, sales, and service.
- To defer any long-term plans until first year objectives are met.
- Current strategies toward long-term business opportunities are not evident at this point.
- Executives interviewed by INPUT indicate that National Semiconductor is in a mood to sell the NAS-installed base.
- The "Shark" is the only product being developed by NAS.
  - Architecture will be out-of-date within two years.
  - Technology is state of the art, gate array logic.
  - Extended product life is possible if no breakthrough occurs in 64K bit reliability and availability needed for IBM "H" series impact.
- There are reports that the San Diego facility is to be phased out of computer product development and production, and that NAS will look only to Hitachi for computer products after FY 1981.

#### 4. FINANCIAL PERFORMANCE

- National Semiconductor continues to improve financially closing the 1980 fiscal year on May 31, with \$980 million in sales.

- Profits were up 53% to \$52 million.
- NAS had a slight loss, but almost recovered to break even with marketing and field engineering profits.
- For fiscal year 1980, the parent company is forecasting an increase in sales of \$195 million to become the second Santa Clara County, California company to exceed \$1 billion in sales.
  - The forecast includes a 75% increase in computer products sales to \$210 million.
  - Based on NAS product marketing forecasts, such an increase would come only from heavy emphasis on the sale of Hitachi products.

## B. CONCLUSIONS

- The NAS/Intel user-installed base is a valuable base on which a significant computer products business can be built.
- National Semiconductor has not yet made a long-term commitment to computer products, and may very well be unaware of the potential that exists.
- National Semiconductor is financially capable of supporting a strong effort in computer product sales and service.
- National will continue to make NAS an attractive subsidiary for potential acquisition over the next year and will keep options open for the best offer.
- National is dependent on Hitachi products to achieve the immediate objectives but will probably not agree to the level of forecasted shipments necessary to negotiate exclusivity for Hitachi products in the U.S.

### C. RECOMMENDATIONS

- Hitachi is in a position to watch the NAS-installed base and bid for the business before the image deteriorates significantly.
  - Supply NAS with systems on a nonexclusive basis for the remainder of the year while continuing to examine other options for U.S. market penetration.
  - Withhold exclusivity as a negotiating advantage to become involved in merger and/or sales discussions with other companies.
  - Survey the NAS user-installed base periodically, every quarter, to assure that the value is being maintained.
  - In very critical meetings with NAS, where strict interpretation of communications is absolutely necessary; retain the services of a consultant to attend meetings with Hitachi to act as interpreter.
- Encourage discussions of an alliance among NAS, STC and Hitachi; with STC taking the initiative and leadership role in any joint venture or merger.
- Hitachi should maintain a posture with National which sends a clear message that there is not enough evidence of commitment to the computer products business by National's top management.
- It should be clear to Charles Sporck and Peter Sprague (Board Chairman) that Hitachi expects to see a stronger leader with a computer products track record at the head of NAS before a permanent Hitachi/National relationship can be maintained.



- Hitachi should seriously consider setting up a fabrication and assembly plant using U.S. labor to take advantage of the large federal government competitive installed base.
  - U.S. value added of 51% would remove penalties on bids submitted to civilian government agencies.
  - An American assembly and fabrication plant licensed and inspected by Hitachi could penetrate the Defense Department's installed base closed to foreign manufacturers.
  - Hitachi would have access to the federal government through Vion, which is comprised of the key marketing contingent of the old Itel Federal Marketing division.



### III FIELD RESEARCH



### III FIELD RESEARCH

#### A. METHODOLOGY AND SCOPE

- Nineteen interviews were conducted with management personnel having current or recent association with National Advanced Systems and/or Itel.
  - Two division presidents were personally interviewed.
  - Three vice presidents and four directors were interviewed.
  - Fourteen personal, face-to-face interviews were conducted.
  - Five executives were interviewed in telephone conversations lasting from 30 to 45 minutes each.
  - Executives interviewed were from:
    - Product marketing and planning.
    - Software support and development.
    - Field engineering line management.
    - Training and technical support.

- . Personnel.
  - . International marketing.
- All field interviews were unstructured in nature with the following topics covered in most conversations:
  - Product plans.
  - Marketing plans and projections.
  - Organization and lines of authority.
  - Management characteristics, strengths and weaknesses.
  - Field service plans.
  - General strategy.
  - Financial performance.
  - Attitudes toward users.
  - Attitudes toward vendors.
  - What happened to Intel people?
  - Rumors or plans to reorganize or merge with other companies.
  - International business prospects.
  - Personal attitudes toward National Advanced Systems, National Semiconductor and Hitachi.



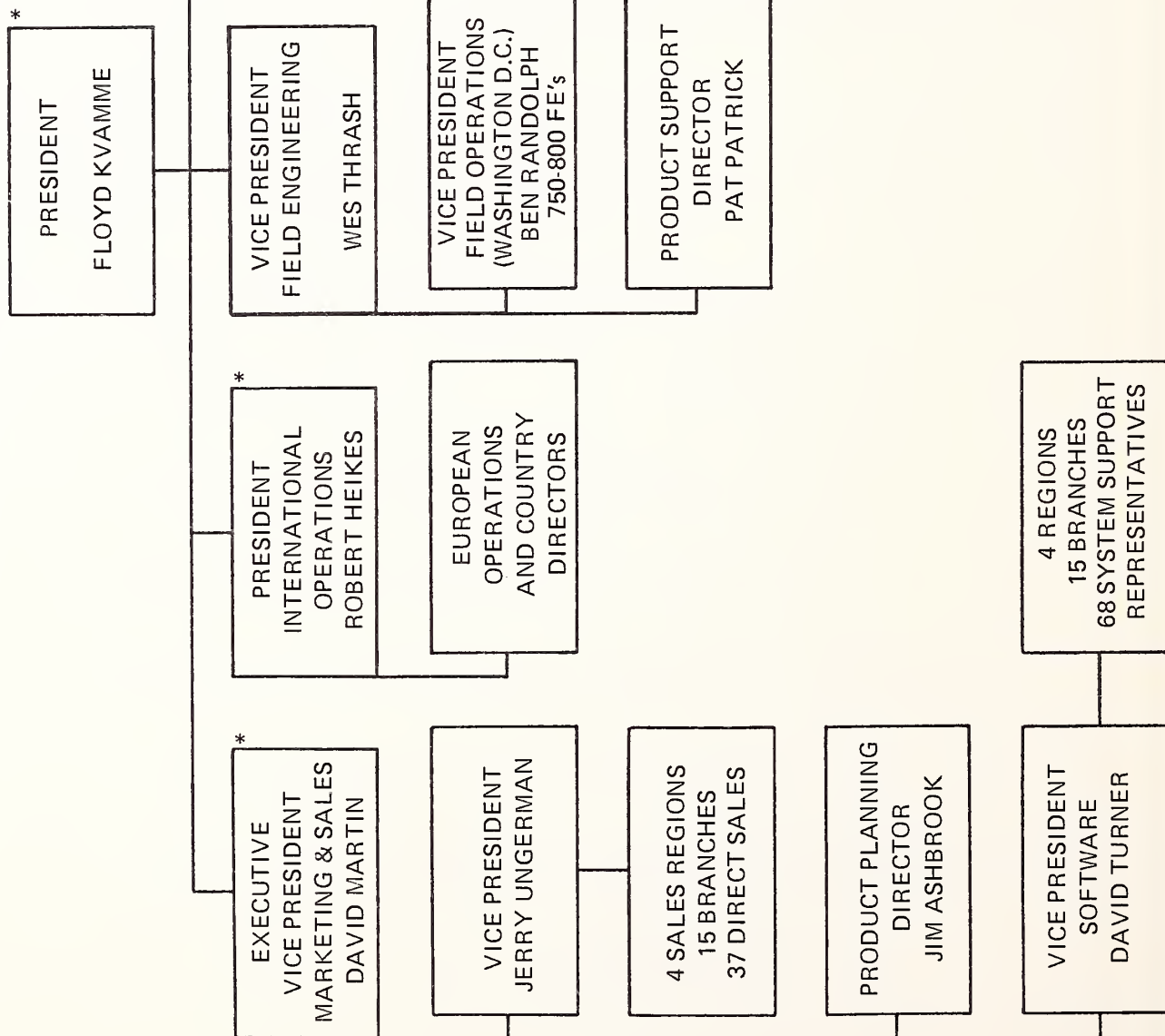
- Comments on recent publicity in magazines and newspapers.
- Other field research efforts included:
  - Current news articles in business and trade journals.
  - Questions to executive recruiters about activities associated with National Advanced Systems.
  - Discussions with other industry executives regarding prospects for National Advanced Systems.

## B. ORGANIZATION OF NAS

- National Advanced Systems is organized along traditional lines of authority when viewed from within the subsidiary, as shown in Exhibit III-1.
  - The president's office is run by an executive committee consisting of the President, the Controller of the parent company and the Executive Vice President.
  - The major divisions of responsibilities are:
    - . Marketing and sales.
    - . European operations.
    - . Field engineering.
    - . Finance and administration
    - . Product development and manufacturing.

# EXHIBIT III-1

## ORGANIZATION - NATIONAL ADVANCED SYSTEMS



\*OFFICE OF THE PRESIDENT  
FLOYD KVAMME  
DAVID MARTIN  
ROBERT HEIKES  
ALBERT MOYER  
(N.S.C. CONTROLLER)

- When the organization is viewed from the perspective of the parent company, one sees a "matrix management" arrangement.
  - For example, the Vice President of Field Engineering (Wes Thrash) reports to the President of National Advanced Systems (Floyd Kvamme) and also to the Vice President of Consumer Products for National Semiconductor (Fred Bialek).
  - The dual reporting arrangements create confusion and conflicts of priorities within National Advanced Systems.
  - "Matrix management" is cited as one of the key reasons for the dissatisfaction of most of the managers who transferred from Intel.
- The domestic sales organization had 37 direct sales personnel as of July 1, 1980.
  - Branch managers of sales typically assist in sales. As of July 1, 1980, NAS had 15 branch sales managers in place, some carrying city territories of their own.
  - Up to ten sales personnel are reported to be working out notices of termination (unconfirmed).
- As of July 1, the domestic field system support organization, which provides software and technical support to systems sales, consisted of 68 system support representatives and 19 managers who routinely assist sales with complex proposals.
- Six system support specialists are located in Palo Alto to assist in prospect benchmarks and provide back-up support in the field.
- The domestic field engineering organization has between 750 and 800 persons, including management and support personnel.

- A common complaint of marketing and field engineering personnel is that their direction is coming down from a semiconductor manufacturer's point of view instead of a computer products marketing perspective.

### C. MANAGEMENT

- The most common feeling among persons with computer backgrounds is that the management in control of National Advanced Systems does not understand the end-user marketplace.
  - As stated by a director from Itel, "They just don't know what they are doing."
  - From a product marketing and planning manager who left one week before being interviewed, "They are accustomed to the demand always being greater than supply and having only one problem - build enough chips to meet the demand."
- David Martin, Executive Vice President and key to market penetration, is perceived as a very bright individual with little ability to manage people. (This view was shared by several of those interviewed.)
- Bob Spencer is perceived as a fairly intelligent and qualified engineering and manufacturing leader, but one who does not go up against the "system" to get priorities for his products.
  - Several executives indicated that the "Lightning" project should have been terminated earlier.
  - Two executives expressed concern that key features of the "Hawk," inherited from Itel, were not incorporated to salvage the "Lightning" project.

- Manufacturing has become dependent on suppliers and subcontractors for up to 80% of the fabrication of systems leaving very little room to directly manage less expensive systems' costs.
- Wes Thrash, Vice President of Field Engineering, is perceived to be out of his class as a field service executive. It has been practically impossible for him to win the support of the field service management group transferred from Intel.
  - "Matrix management" and his allegiance to Fred Bialek are blamed for some of Wes Thrash's problems with the computer product field engineering managers.
  - Other management people interviewed said that Wes Thrash was fine for a limited product line like point-of-sale products or tape drives, but the computer business was too big for him.
- Floyd Kvamme is generally perceived as a good management person for high volume business with low profit margins.
  - Kvamme does not impress experienced computer executives used to dealing in "big ticket" items where unit sales projections become much more significant.
  - Several of the executives reported that Floyd Kvamme was not a strong delegator.
- Jerry Ungerman, Vice President for Domestic Sales, is perceived by most as a good local salesman for the midwestern states, but not as a good sales executive.
- While no longer a part of National Advanced Systems, Dave Pappert, President of Vion and former President of the Federal Government Sales Division, is perceived as the most aggressive and best outlet for the "Advanced Systems" product line through a licensing arrangement between Vion and NAS.



- Robert Heikes, President of International Operations, is perceived by Europeans much the same as Kvamme is by domestic personnel - fine for the semiconductor or consumer market but not aggressive enough for the computer products marketing effort in Europe.
- None of the executive search firms questioned know of any search being conducted for a chief executive officer or other high level executive who might upgrade the management style at National Advanced Systems.

#### D. EX-ITEL PERSONNEL

- Key Itel personnel leaving since the merger with National Advanced Systems left mostly because of incompatible management styles. Some comments follow:
  - "I thought that Sporck was committed to taking advantage of the installed base with aggressive marketing strategies - he wasn't." (Director in product planning.)
  - "They will not spend the money to support complex systems proposals." (Marketing support manager.)
  - "There are too many good opportunities around to bother with staying around to teach these people the computer business." (Division president.)
  - "I can't work for a company where I have to go all the way to the president of the parent corporation to get approval for a \$1,000 per month clerical person." (Training director.)



- More than one reliable source reported that a large number of ex-Intel people were waiting until October 1, 1980 to resign in order to take advantage of "vested rights" in the investment program with matching funds from Intel.
- Executives reported up to \$20,000 of matching funds in individual accounts being held back as incentives to work out the full year (October).
- A key technical support group, including the manager, has indicated to one executive search consultant that the group could be recruited as a unit on October 1, 1980.
- Ex-Intel personnel who were important to development, testing, and marketing Hitachi products have remained close to the industry either as independent businessmen or as employees of competitors to National Advanced Systems. (See Exhibit III-2 for a partial listing.)
- Most of the individuals that had significant influence in the success of Hitachi products introduced through Intel to the United States have remained in the San Francisco vicinity.

#### E. PRODUCT STRATEGY

- Most of the executives agreed that National Advanced Systems appears to be phasing out of the computer products development business.
- Except for the "Shark," all new products sold by NAS are expected to be supplied by Hitachi after the next year or so.

## EXHIBIT III-2

## SAMPLE EX-ITEL PERSONNEL

PERSON	ITEL POSITION	PRESENT LOCATION
JOHN DIEDENHOFFEN	DIRECTOR, PRODUCT MARKETING - PERIPHERALS	MEMOREX
JOHN CLARK	PRESIDENT, DATA PRODUCTS GROUP	MICOM
DICK WHITCOMB	V.P., PRODUCT MARKETING	AMDAHL
JOHN BOCK	V.P., SYSTEMS DEVELOPMENT	MASSTOR
DICK LUSSIER	EXECUTIVE V.P., ITEL CORP.	MASSTOR
DAVE PAPPERT	PRESIDENT, FEDERAL DIVISION	VION
REX RASSMUSSEN	PRESIDENT, F.E. AND SYSTEMS DEVELOP- MENT DIVISIONS	LAZOR
CHUCK DUNBAR	PRODUCT MARKETING, LARGE SYSTEMS	ADVANCED EDUCATION SYSTEMS
TOM MARTIN	MANAGER, FIRMWARE DEVELOPMENT	FMC
JAN JANKU	ADVISORY ENGINEER	MEMOREX
NUCCIO CONDALMARI	PRESIDENT, ITEL INTERNATIONAL	CONSULTING IN MILAN, ITALY

## EXHIBIT III-2 (CONT.)

## SAMPLE EX-ITEL PERSONNEL

PERSON	ITEL POSITION	PRESENT LOCATION
GIOVANNI BRIGNOLI	INTERNATIONAL PRODUCT MARKETING	OLIVETTI (CALIFORNIA)
DAVE BONINI	INTERMEDIATE SYSTEMS PRODUCT MARKETING	CONSULTANT (MASSTOR)
DAVE PEASE	MANAGER SOFTWARE DIAGNOSTICS	SYSOREX
JIM GAFKE	PRESIDENT, COMPUTER PRODUCTS	BRAE (SAN FRANCISCO)
RON ALLEN	DIRECTOR, PRODUCT ASSURANCE	APPLIED EXECUTIVE SCIENCES
DAVE FULLER	DIRECTOR, HAWK DEVELOPMENT	LAZOR
DARRYL SCHOFIELD	MANAGER, TECHNICAL PUBLICATIONS	CONSULTING (CALIFORNIA)
BOB MONTE	EXECUTIVE V.P., FIELD ENGINEERING	ADVANCED EDUCATION SYSTEMS

- Mixed opinions were expressed on the "Shark."
  - . Marketing specialists believe that the "Shark" does not represent an upgrade in technology because of the 370/158-based architecture.
  - . Field engineering specialists see the "Shark" as a state-of-the-art system because of gate-array logic with higher density and speed.
  - . Three models of the "Shark" are planned ranging from 1.3 MIPS to 3.6 MIPS; price tags are projected from \$200,000 to \$320,000.
- The "Lightning" project was cancelled after a loss of approximately \$22 million.
- The "400" unibus system was cancelled in late 1979.
- The "Hawk" was never considered to be a viable alternative to the "Lightning."
- A European source was quoted as saying that Charles Sporck sent down a directive to phase out San Diego as a computer manufacturing facility and use it for components and consumer products. (This comment has not been confirmed by a second source as of this writing and is considered to be rumor for the present.)
- Several sources reported that NAS is getting more serious about software development under David Turner.
- Negotiations for the IPL system have been terminated due to excessive field service costs.

- According to sources within product marketing, NAS has yet to initiate a plan to compete with IBM's recently announced peripheral controllers and outboard storage processing.
  - One source expects no reaction within National to IBM's announcements.
  - A second source remarked that systems power measurements are moving toward "transactions per second" and that National Advanced Systems does not want to acknowledge a significant deviation from "MIPS" as the standard.
- According to two separate sources from product marketing, Sporck's major interest in getting exclusivity with Hitachi is to control Hitachi as a potential competitor until he decides whether or not to sell the business. From Sporck's point of view, the greatest obstacle to exclusivity with Hitachi is National's reluctance to guarantee sales of sufficient volume.
- Orders for ISS products were halted in June, 1980.

#### F. MARKET STRATEGY

- With approximately 300 National Advanced Systems and 100 Hitachi systems installed, marketing sources project a slower pace for the new fiscal year according to a reliable marketing source:
  - "Sixty-four total systems to ship in remainder of calendar year 1980."
  - "About twenty Hitachi systems should be sold this year."
- National inherited (or took back) from Intel approximately \$25 million worth of unsold inventories in October of 1979.

- Basic strategy was to take over sales effort to assure that systems were sold rather than returned by court decree.
- Follow-on strategy was to see where NAS would be after solving the basic problem.
- After cleaning up the inventory problem and breaking even, it is yet unclear as to whether National is prepared to make the long-term commitment to computer products.
- Dave Martin continues the process of trimming to a minimum field sales force.
- Ability of NAS to prepare and present formal complex systems proposals exists only in certain locations.
- No person interviewed indicated that there was any sales strategy for computer products beyond the next year.
- NAS is offering operating leases only on the AS/3000 through AS/5000 series.
  - Sources at NAS refuse to discuss lease/purchase ratio guidelines, which are individually negotiated.
  - According to reports, there are no systems installed on operating leases yet this year.

#### G. BUSINESS STRATEGY

- The consensus of opinions is that National is keeping all options open and will be responsive to any serious offers to take over the computer products business.



- It is believed internally that National enjoys a low-risk position as long as it can return the business to Intel Corporation "as is."
- The basic short-term objectives have been met:
  - . The AS/3000 and AS/5000 inventories are essentially cleaned up.
  - . NAS has a near break-even performance since acquisition of the Intel business by National Semiconductor.
- A key person who resigned from NAS in June, 1980, said that he had been working on a proposal to sell the NAS installed base to the Amdahl-STC merger.
  - (NOTE) With the Amdahl-STC merger called off, STC could become a target purchaser for the NAS-installed base.
- Two NAS executives fear that if the installed base is not sold within a year, it will no longer have real value.
  - They do not see aggressive sales efforts to upgrade the installed base.
  - They see Vion, a licensed outlet, as the only aggressive activity of any major consequence remaining.
  - They see no enthusiastic effort to develop new products or sources of products.
- Charles Sporck is reported to be visiting the president of Olivetti in Italy early in July. Reports from Olivetti indicate that they have no agenda or notice as to the purpose of Sporck's visit.

- The best conclusion on general business strategy is that National is presently in a mood to defer any decisions until the end of the year, October at the earliest.
  - Maintain a lean organization to show profitable operations each quarter.
  - Keep all options open.
  - Control Hitachi until decisions are made to commit or sell.

#### H. FIELD ENGINEERING

- The field engineering division, consisting of 750 to 800 personnel from Itel, remains essentially intact.
  - Ben Randolph, Vice President of Field Operations, has remained with the company running the field from the Washington, D.C. area.
  - Pat Patrick, formerly Vice President of Product Support at Itel and now Director of Computer Product Support at NAS, remains as a stabilizing influence in the technical support function.
  - Bob Benjamin, Director of Education, has kept some key personnel involved in training.
  - Several key region managers from Itel remain with NAS, holding loyal field engineering personnel to the company.
- The stabilizing management people from Itel all indicate a level of dissatisfaction and will look favorably on other opportunities by the end of this year if certain conditions are not met:

- "National Semiconductor must show a greater long-term commitment to computer products as a going concern."
- "We need a strong chief executive officer who understands this part of the business and who will fight for our priorities."
- All of the key NAS management people from Intel expressed a keen interest in working with an acquisition by Hitachi, Storage Technology, or some other "quality" computer products organization.
- Several former Intel employees who left NAS for personal reasons have expressed interest in returning under different top management or returning subject to acquisition by a reputable company like STC or Hitachi.
- Field engineering for computer products at NAS continues to show a profit, which may be inflated by 10-12% of revenues.
  - Spare parts have been leased from Intel for only 4% of field engineering revenues.
  - Field engineering has been using test equipment and tools owned by Intel, depreciation and risk being minimal to NAS.
- NAS is reported to be purchasing from \$18 million to \$20 million of the \$40 million spare parts inventory owned by Intel.
- Field engineers, at the customer contact level, generally feel more secure with the current situation at NAS.
  - National Semiconductor austerity programs have given the field engineers a feeling of permanence versus the fast-paced flamboyance of Intel.

- Field engineering line management from Intel have done a creditable job in shielding local personnel from their own (management) concerns about the long-range prospects for NAS.
- Field engineers with good customers and challenging computer products to work with are not likely to blindly follow managers who elect to leave NAS later this year.
- Field engineers who have been involved with vendor-development programs and continuation engineering are feeling the void with such activities being more structured at NAS.
  - Most of these project-oriented field engineering specialists have left NAS.
  - The project-oriented field engineer is the most likely type to follow key management to another company, especially if the manager promises him greater involvement in projects.
  - Examples of this type of project-oriented field engineering specialist produced by Intel and known to Hitachi are:
    - Paul Nehse - now working with MASSTOR in Sunnyvale.
    - Dave Pease, diagnostic development, now at Sysorex.
    - Noah Jergler, key specialist in AS/5 development and training, now at MASSTOR.
    - Bill Cox, key architectural and technical consultant in large IBM system compatibility - still with NAS and working as liaison with Hitachi.

## I. INTERNATIONAL BUSINESS PROSPECTS

- The European operation continued the momentum set in sales at Itel during 1978 and early 1979, and produced proportionally greater sales and profits than the U.S. sales force did.
  - Europe had the momentum going that resulted from heavy internal competition at Itel to beat all sales marks set by the domestic sales organization. The challenge was officially issued by Itel International at the 1978 100% Club held in January, 1979.
  - European operations retained a greater level of autonomy immediately after the NAS takeover.
  - IBM loyalties are not as solid in Europe as they are in the U.S. In fact, there is greater user hostility toward IBM in certain European quarters.
  - Itel's financial problems have not received the publicity in Europe that they have in the U.S.
- The European sales began to fall rapidly in March and April of 1980.
  - Momentum is gone.
  - Complaints resembling those of the U.S. sales force are becoming more frequent in Europe.
    - "They are trying to run an international computer products sales organization with a semiconductor mentality."
    - "Our people are drifting away without the Joe Foster or Condulmari type leadership."
- One source reported that Europe has postponed training on the AS/8.

## J. FINANCIAL PERFORMANCE

- National Advanced Systems achieved its primary objectives in fiscal year 1980 which ended May 31.
  - Clean up the inventory problem left by Itel.
  - Offset manufacturing losses of some \$20 million in San Diego and approach a pre-tax breakeven before going into fiscal year 1981.
- The parent company reported \$980 million in sales and a 53% improvement in profits (up to \$52 million from \$34 million in 1979).
- The parent company forecasts gross sales of \$1,175 million for FY 1981, an increase of \$195 million or 20%.
  - The parent company forecasts 49% of the increase in sales (\$95 million) in computer and add-on memory sales.
  - Computer and add-on memory sales are projected at \$210 million, 75% greater than last year.
  - Securities analysts express concern that National Semiconductor will fail to meet profit objectives unless NAS computer sales offset recessionary problems in semiconductor sales expected to be felt in the November timeframe.
- Best performers for NAS's benefit are the field engineering division and Vion, an independent spinoff of Itel licensed to sell and lease NAS products to the federal government.



- NAS is exposed to greater financial risks in the current fiscal year by assuming ownership of maintenance assets in spare parts, tools and test equipment, risks to profitability from:
  - Accountability for capital asset depreciation.
  - Accountability for missing inventories and "cannibalized" machines.
  - Spare parts usage and turnover costs should run closer to 12% of maintenance revenues than the 4% recorded last fiscal year.
  - Inventory carrying costs will run from 25-35% of the cost of spare parts or another 12-18% of maintenance revenues at traditional levels of stock.
- NAS is exposed to any arbitrary decision by Vion to change suppliers for the federal government business.
- There is no evidence that National Semiconductor Corporation has committed equity funding to National Advanced Systems. All reports indicate that NAS is to be run like a division, self-supporting with only short-term cash flow assistance from National Semiconductor.

#### K. UNCONFIRMED RUMORS AND SPECULATION

- "NAS is going to be returned to Intel before NSC has to assume any liabilities for assets or special contract conditions left behind by Intel."
- "Hitachi will not give up exclusivity to NAS until they prove themselves. Hitachi is looking to go direct to the U.S. market by recruiting ex-Intel people in sales and service."

- "NAS has approached Fairchild and Magnuson for a sale or merger."
- "San Diego is to be phased out of the computer business with NAS setting up a 53% joint venture with Hitachi to sell the installed base."
- "STC looks like the best bet for NAS now that Amdahl is out of the picture."
- "There's not much chance of Rex Rassmussen pulling together another development organization, even if he had \$100 million to back him."
- "Sporck would give the business away just to get rid of it."
- "NAS needs Hitachi more than vice versa."
- "I am afraid that Sporck is going to just let that installed base dry up out there if nobody comes along to buy it."
- "NAS is taking an aggressive approach to launch a whole new business plan based on the current installed base and a joint venture arrangement with Hitachi."
- "The European operation is being sold to Olivetti."

#### IV USER ANALYSIS



## IV USER ANALYSIS

### A. USER PROFILE

- Twenty-two users were interviewed by telephone for this report. The sample was comprised of:
  - Eleven companies with National manufactured (AS/3000 - AS/5000) mainframes installed.
  - Eleven companies with Hitachi manufactured (AS/7000 or AS/6) mainframes installed.
- The majority of users (18 of 22) had only one NAS mainframe installed.
- Installation dates for current systems were evenly distributed over a 2½ year span (12/77 to 6/80).
- Respondents were typically Director or Assistant Director of Data Processing.
- Respondents represented a diverse industry mix, including federal government, state and local government, education, utilities, wholesale, process manufacturing and insurance.

- An attitude survey such as this includes questions of an open-ended nature which yield highly qualitative responses. A number of these have been directly quoted or paraphrased (without attribution).

## B. ANALYSIS OF SURVEY RESULTS

### I. USER ATTITUDES TOWARDS INSTALLING ADDITIONAL PLUG COMPATIBLE MAINFRAMES (PCM)

- All but one of the respondents said they would consider installing additional PCMs due to satisfaction with present equipment.
  - Comments from users of Hitachi manufactured systems:
    - "Very reliable - very few problems."
    - "The AS/6 is the most reliable piece of equipment we ever had."
    - "We had an IBM 155 - it was killing us! If we didn't get the AS/6, a lot of us wouldn't be working here."
  - Comments from users of National manufactured systems:
    - "We were very impressed with the machine, operations and service."
    - "Has been as reliable as our predecessor unit (IBM 370/145). Maintenance service is excellent, computer has done all that we anticipated."



- . "We are in the process of buying new equipment. We would consider any vendor whose price/performance/reliability met our needs."

## 2. USER-PERCEIVED DETERRENTS TO THE PURCHASE OF PLUG COMPATIBLE MAINFRAMES

- Many users said they saw no deterrents to the purchase of PCMs.
  - Some typical comments were:
    - . "We have had no problems with the AS/6 or with Intel equipment. Usually installation is a problem, but we installed the AS/6 over the weekend; it was up Monday morning and hasn't been down since!" (System was installed in 12/78.)
    - . "Intel was our first venture with PCMs. If all experiences are as good as this one, we would definitely go PCM." (AS/6 user.)
- Possible deterrents mentioned were:
  - Software maintenance (4 mentions).
    - . "If a shop were undergoing a major conversion, it might be better to stick with IBM because of their fantastic software support."
    - . "Software support needs improvement."
    - . "We find we will never be able to use the operating system the way it was meant."
  - Problems associated with the use of multiple vendors (3 mentions).
  - Vendor stability (3 mentions).

- Residual values (3 mentions).

### 3. PURCHASE OR LEASE OF SYSTEMS

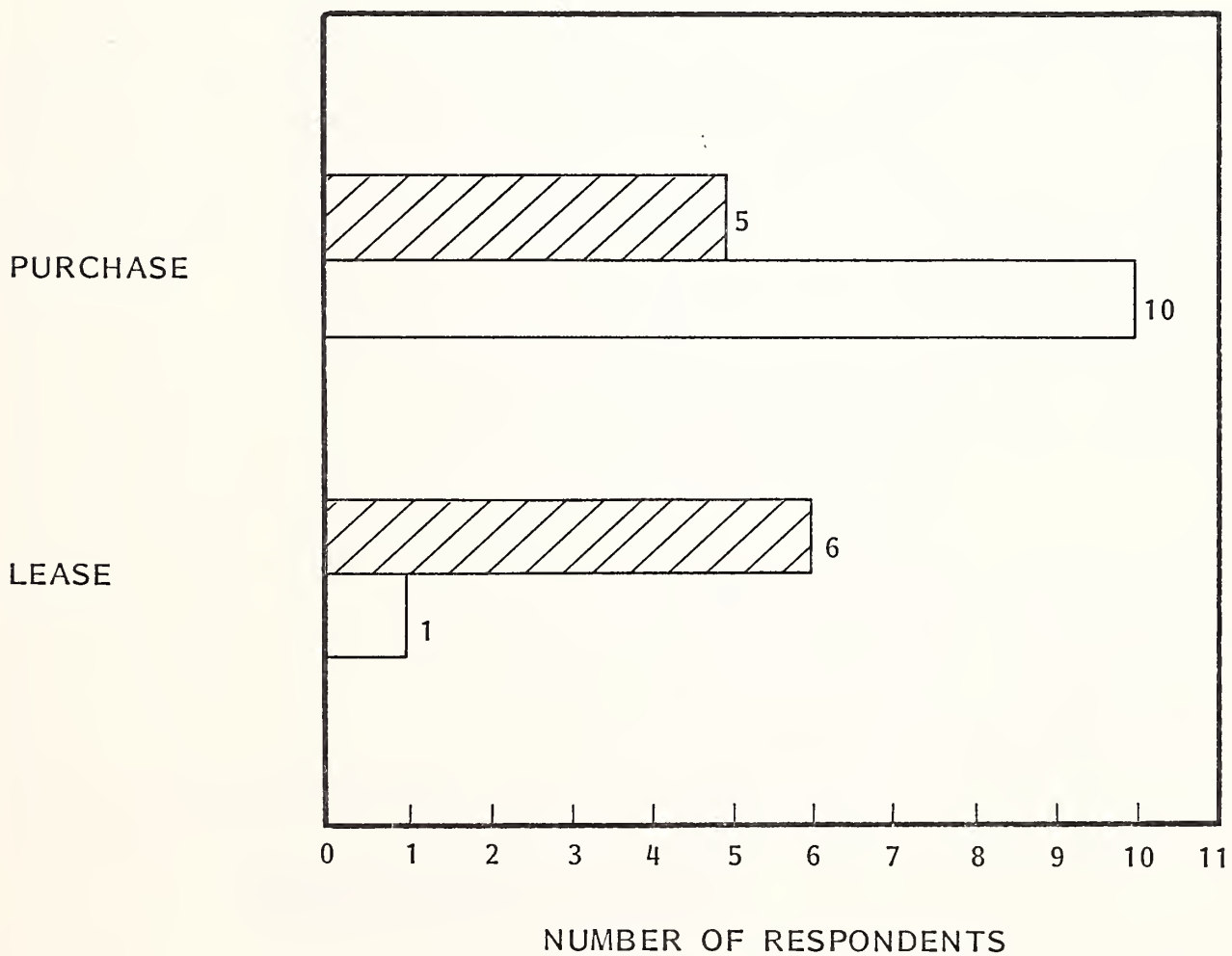
- As shown in Exhibit IV-1, the majority of users of National systems (10 of 11) purchase their equipment, while less than one-half of the users of Hitachi systems purchase their equipment.
  - Of those users leasing, irrespective of system size, only two said either ITEL or NAS held the paper.
  - The number of responses referring to lease length was so small, any meaningful conclusion is negated.

### 4. USER WILLINGNESS TO IMPLEMENT NAS ENHANCEMENTS

- Most users surveyed expressed a willingness to implement enhancements announced by NAS, as shown in Exhibit IV-2.
  - These respondents qualified their positive response by saying they would consider NAS because of present satisfaction, but would explore all options available to them.
  - Some comments made were:
    - "We may ... We're bound to be at least a little loyal with NAS because of success and satisfaction to date. We will explore all ways to satisfy upcoming needs - keep all avenues open."
    - "We want to get the best buy for our dollars ... So far our system has been very satisfactory."

EXHIBIT IV-1

NUMBER OF RESPONDENTS  
PURCHASING OR LEASING SYSTEMS





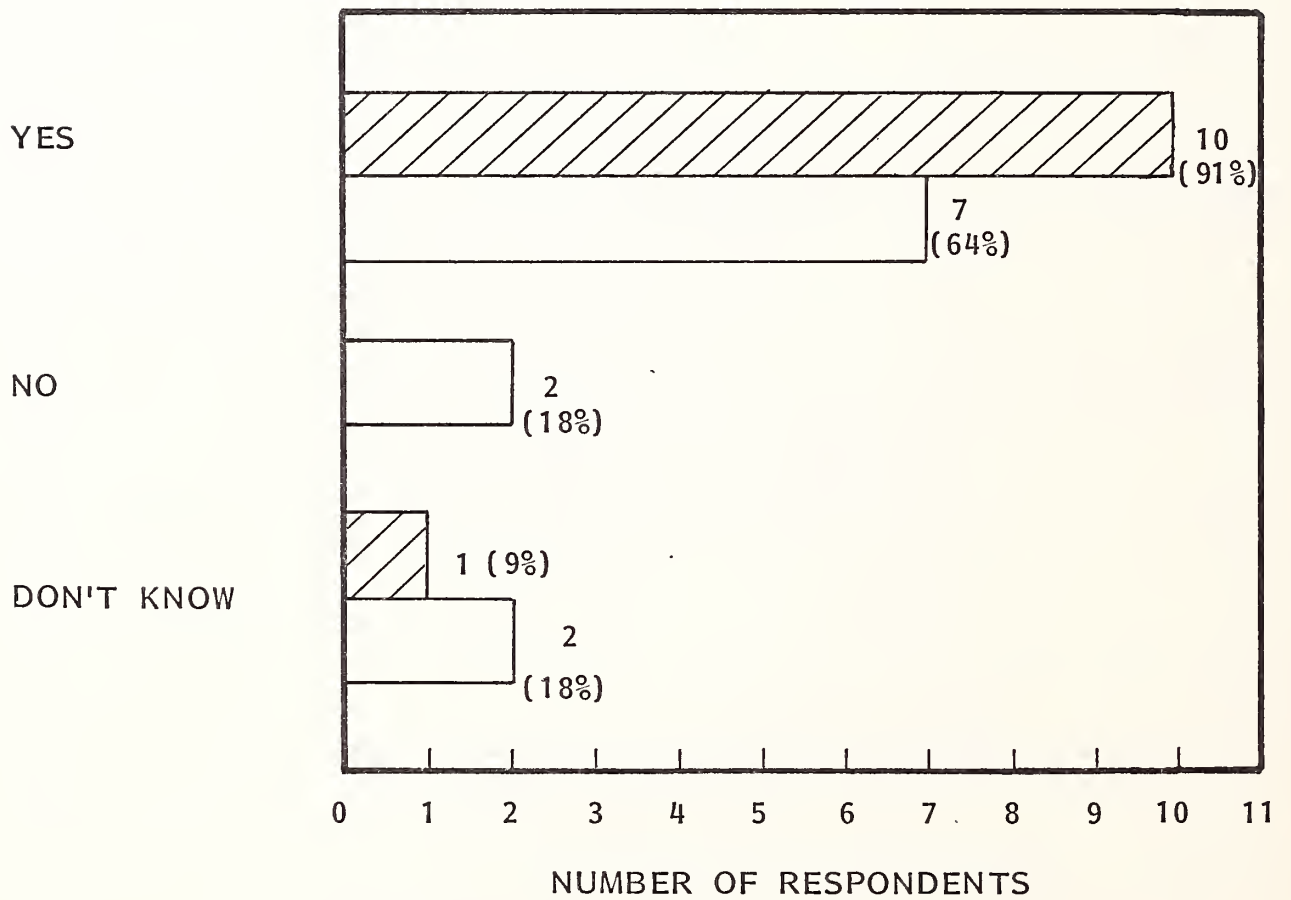
 = HITACHI  
 = NATIONAL

EXHIBIT IV-2

WILL YOU UPGRADE YOUR INSTALLED  
BASE TO INCLUDE FUTURE ENHANCEMENTS  
AS ANNOUNCED BY NAS?



 HITACHI  
 NATIONAL

## 5. DISK DRIVE MANUFACTURERS

- Only nine of 22 respondents indicated that they used Hitachi or ISS drives; three are using Hitachi. User evaluations of the two drives varied tremendously, ISS being the only drive in the survey to receive poor comments.
  - Four respondents said performance for ISS drives was "good," and in three out of four of these instances referred to them as Intel drives. Negative comments always referred to the drive as an ISS product.
  - Comments on ISS disk drives:
    - "Poor. They don't have the up time that we need - they're always broken."
    - "It (performance) stinks! We have had to replace the HDAs two to three times on given drives. But if comments are based on price/performance, they would come out high in the ratings. We paid only one-third the purchase price for the ISS 7350 than we would have for the IBM 3350. We got what we paid for! No other disk drive runs as badly."
    - "Prior to three months ago, we had serious problems. The first year saw considerable engineering changes - The HDA went bad and was replaced - reliability was poor. However, we haven't had a failure in the last three months, so hopefully things will go better."
  - Comments on Hitachi disk drives:
    - "Hitachi is one of the best pieces of equipment out there!"
    - "Extremely good."

- "We've had them only three weeks, but feel they are 'utterly fantastic.' We did a lot of research with users before getting the drives - everyone was extremely pleased!"
- Sixteen of 22 respondents used vendors other than Hitachi or ISS for disk drives. Vendors included IBM, CDC, Memorex, STC and Telex.
  - Users were almost universally very satisfied with these other products (15 of 16).
  - IBM disk drive products were predominate with users of Hitachi systems (6 of 11).
  - Users of National systems tended to display an even distribution of disk drive manufacturers.

## 6. USER RATINGS OF MAINTENANCE PERFORMANCE

- All maintenance on systems surveyed was performed by NAS, although five respondents identified the maintenance vendor as Itel. Maintenance ratings were high, averaging 4.2 on a scale of 1-5, with 5 being outstanding.
  - Only two respondents gave NAS a 3 rating, stating lack of software support as the reason.
  - Comments on maintenance:
    - "Good response time and repair time. We have only been down once for three hours."
    - "Very quick to respond to our needs - here instantaneously after we call."
    - "When we have problems, they're right in there!"



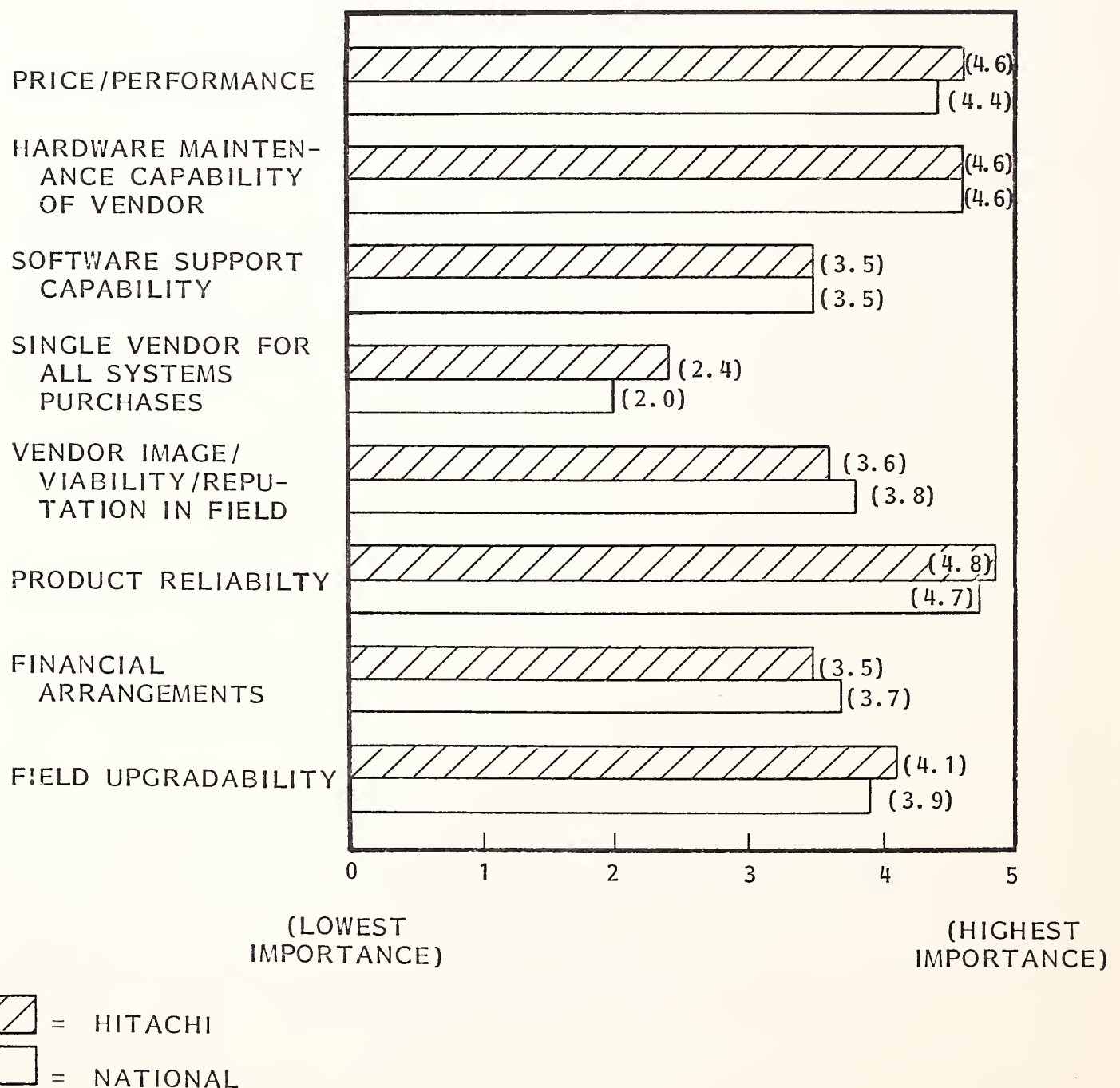
- . "...they arrive as soon as feasible - much quicker than IBM would. It is evident they spend a lot of time on their field service program."
- . "NASCO's responsiveness and willingness rate very, very high. IBM doesn't like to give wholehearted support to mixed vendor shops. They won't say that, but I know it's true."
- . "We're very pleased with NAS. Qualification levels of personnel are very high. We have the same people that worked for Itel. NAS has even pinpointed problems on IBM equipment."

## 7. IMPORTANCE OF FACTORS IN SELECTING A PLUG COMPATIBLE MAINFRAME VENDOR

- As shown in Exhibit IV-3, user ratings for importance of factors in selecting a PCM vendor were similar in both mainframe categories. When asked to rank factors, most users claimed product reliability was their major consideration, followed closely by price/performance and hardware maintenance capability of the vendor.
  - One respondent replied:
    - . "None of us knows if PCMs will be here five years from now. It is product utility (reliability) that is important rather than vendor image. As long as there are parts and someone to maintain it, we can use the system and throw it away when we're finished."
  - Several comments were made on the area of software support capability:
    - . "... this is very tough to rate. You must remember I depend on IBM for software support. I have no confidence in NAS's ability

# EXHIBIT IV-3

## IMPORTANCE OF FACTORS IN SELECTING A PLUG COMPATIBLE MAINFRAME VENDOR AS REPORTED BY RESPONDENT USERS (AVERAGE)



to provide quality in that area because they are thin in bench strength and their people are scattered. I will look to them in the future though, because of new software releases from IBM."

- . "Got into problems here. We have IBM software. When we switched to Intel, IBM was not too pleased with us. IBM didn't continue providing the same level of support as previously."
- . "We had a long battle over this. It bears heavily on whether the site is a sole source or a mixed shop. We also have an IBM 145."

#### 8. USER COMMENTS ON EXTRA EFFORT OF NAS SUPPORT PERSONS

- Ten respondents indicated that NAS support was above standard, although few could give specific examples. Eleven users generally felt service was good, but routine.
  - Of the ten respondents citing support persons as being informative and concerned, emphasis was placed on their willingness to assist in maintenance on other vendors' equipment.
  - Comments made were:
    - . "Very helpful - even tries to assist other vendors and their equipment problems. Very service oriented!"
    - . "They go out of their way to help. Are very informative. If they see anything they think will go wrong in the future they notify us."
    - . "Aside from being available on-site, he is very helpful to the other vendors and takes on a lot of responsibility for our overall successful operations!"

- . "He keeps us up to date on new developments. Anything new that comes up is always available to us."
- . "NAS has gone out of their way to help diagnose on other equipment. They deal with the account as a whole, not as separate (vendors) equipment. This is not like IBM's policy, which we have found quite damaging. IBM is making it difficult to sell much more equipment here! I know (NAS) service isn't this good around the rest of the country - we're a catalyst."
- Comments on routine service:
  - . "None (extras) that I know of. Strictly routine PM and on-call service."
  - . "We get good help, but no 'extras.' We don't have a maintenance person assigned solely to us - we share one."
  - . "Very little - (we) don't depend on him for any extras."
  - . "None worth mentioning - nothing free."

9. USER AWARENESS OF ITTEL SYSTEMS MARKETING BEING TAKEN OVER BY NATIONAL

- All 22 respondents said they were aware of Itel systems marketing being taken over by National.
- Fifteen respondents said they perceived no change in the level of service as a result of National's takeover. Of the seven respondents who claimed there had been a change in service, all said changes were for the better.
- "Service is more business oriented now."

- "Slightly for the better - especially in the area of SSR support."
- "Improved service if anything."
- "We're much more comfortable dealing with marketing done directly by the manufacturer."
- "A little more in terms of marketing - we now have better contact. Maintenance has been about the same."
- "Improved repair time. Response time is the same."
- "But I feel more comfortable now. National is a more staid company. I don't feel like I'll be left out on a limb." (Respondent who felt there was no change in service.)
- "Hardware, most marketing, systems support are the same - if NAS can keep the level up. But NAS is not as flamboyant as Itel. Itel was very unconventional in marketing. They were free to be aggressive. Our contract started from scratch, and in the end, everything we wanted to see was in it! NAS is more conservative, although we have had no direct contact with them in this area yet. But I don't blame them! They don't want to go under!"

#### 10. INDIVIDUALS INVOLVED IN THE FINAL DECISION TO PURCHASE A MAINFRAME

- Users cited a wide distribution of individuals involved in the final decision to purchase a mainframe.
  - Distribution of number of mentions as follows (out of 22 respondents):

Corporate EDP Director	11
EDP manager	6
President or Chairman	5
Committee decision	5
Vice President of Data Processing	4
Vice President of Finance, Administration, or Executive Vice President	4
Board of Directors	2
Other:	
Computer staff, Director's staff	2
Technical support	2
GSA Guidelines	1
Government criteria	1
Bid system	1

## II. VENDOR COMPATIBILITY GUARANTEES

- Of the 15 respondents who said they had received a guarantee of compatibility of their mainframe with IBM, 14 stated their guarantee was from Itel, while only one said that NAS had made the guarantee. Five of the 14 respondents with a guarantee from Itel assumed that NAS also backed the contract.
  - Four respondents felt there was no guarantee.
  - Three did not know if there was a guarantee.
- Guarantees were made at the time of purchase; which, for this sample, covers a 2½ year range, from 1978 to the present.
- Twelve of the 15 respondents with guarantees stated they had written contracts; three said the guarantee was "verbal" or "implied."



## 12. USER RESPONSE TO WARRANTY PASS-THROUGH TO HITACHI

- Of the 11 respondents with Hitachi mainframes, only three said the warranty had been passed through from them to Hitachi, seven said that it had not been, and one respondent did not know.
  - Two of the respondents who had not had the warranty passed through to Hitachi, had received assurance from Hitachi as to their support.
    - "I received a letter from Hitachi reconfirming their assistance if necessary."
    - "... I have been verbally assured by Hitachi, that if maintenance fails anywhere else, they will always back the product. They (Hitachi) have made it clearly evident. We are very happy customers. The Japanese are honorable people."
  - One respondent had the warranty passed through, and although they had had no dealings as yet with Hitachi per that agreement, said:
    - "We think Hitachi is fantastic! When we had a Model 1 AS/6 and it needed field upgrades to a Model 2, a group from Hitachi and Intel from California came in over a weekend to make the changes. The experience was marvelous. We're obviously sold on the machine and its stability, but also on the way Hitachi dealt with us as a customer. The Japanese are not only super technicians, but are also very formal and polite - quite different from American service!"

## 13. NAS TRADE-IN POLICIES FOR OLD MACHINES

- The majority of users did not have knowledge of any trade-in policies NAS had for old machines.

- Many users felt their machines were too new, anyway.
- Three companies mentioned previous trade-in arrangements from Itel on IBM machines.
- Three companies indicated they were in preliminary discussions on this topic but did not mention specifics.

#### 14. PERCENTAGE PRICE REDUCTIONS REQUIRED FOR PURCHASING OR LEASING IBM PLUG COMPATIBLE EQUIPMENT

- Most respondents said that no price reductions were required to induce them to purchase or lease plug compatible mainframes or peripherals. These respondents indicated that each purchase was considered as a separate transaction.
- The six respondents who said that a discount was required quoted percentages averaged 10-25% on both peripherals and mainframes.

#### 15. FREQUENCY OF CONTACT WITH PLUG COMPATIBLE MAINFRAME SALESPERSONS

- Twenty of 22 respondents had been contacted by a plug compatible mainframe salesperson in the past six months.
  - Nine of the 20 said they had been contacted only by NAS.
  - Two respondents had not been contacted by any plug compatible salespersons, including NAS.
- Of the 11 who said that they had been contacted by companies other than NAS, Amdahl (9), CDC (5) and Magnuson (3) were vendors mentioned most often.

- One company had been contacted by an Amdahl salesperson, but not by NAS.

## 16. USER PERCEPTIONS OF NAS SALESPERSONS

- Nineteen of 22 respondents had been recently contacted by a NAS salesperson.
  - Three had been contacted within the last two to three months.
  - Five had been contacted within the last month.
  - Eleven are contacted on a weekly or continuing basis.
- Contact by a NAS salesperson was reported as being more frequent by users of larger systems, seven of 11 Hitachi users receiving weekly or more frequent visits.
- Professionalism of NAS salespersons was rated high by respondents, averaging 4.2 on a 1-5 scale, with 5 being highly professional.
  - Positive comments were:
    - . "Rating (4) is for the old salesman who has since left - he was good - had an IBM background. I don't know how to rate the new one yet."
    - . "Very good."
    - . "Very professional - handle themselves well."
    - . "... they're knowledgeable."
    - . "Very pleased."

- . "Outstanding."
- . "No problems - they're in here all the time."
- . "Itel's contracting and installation was refreshing. They are the most complete marketing people I have ever run into."
- Negative comments were:
  - . "No lasting impression one way or another."
  - . "The company has gone through a merger and has had personnel difficulties which always go along with that. IBM's educational standards are higher."
  - . "A professional level 'salesperson' with general information, but not knowledgeable on the technical level I wanted to ask questions about." (gave a "2" rating)

17. WHO IN YOUR COMPANY ATTENDED THE "CHOICE" USER GROUP AT NCC?

- Responses to this question were vague. Ten respondents said someone in their company had attended a "CHOICE" meeting either in San Diego, or at past locations. Seven of these ten were from larger companies with Hitachi mainframes.
- Attendees were mostly at the data processing director level.
  - Comments made were:
    - . "Fairly effective meeting."
    - . "We do maintain a close following of that group."

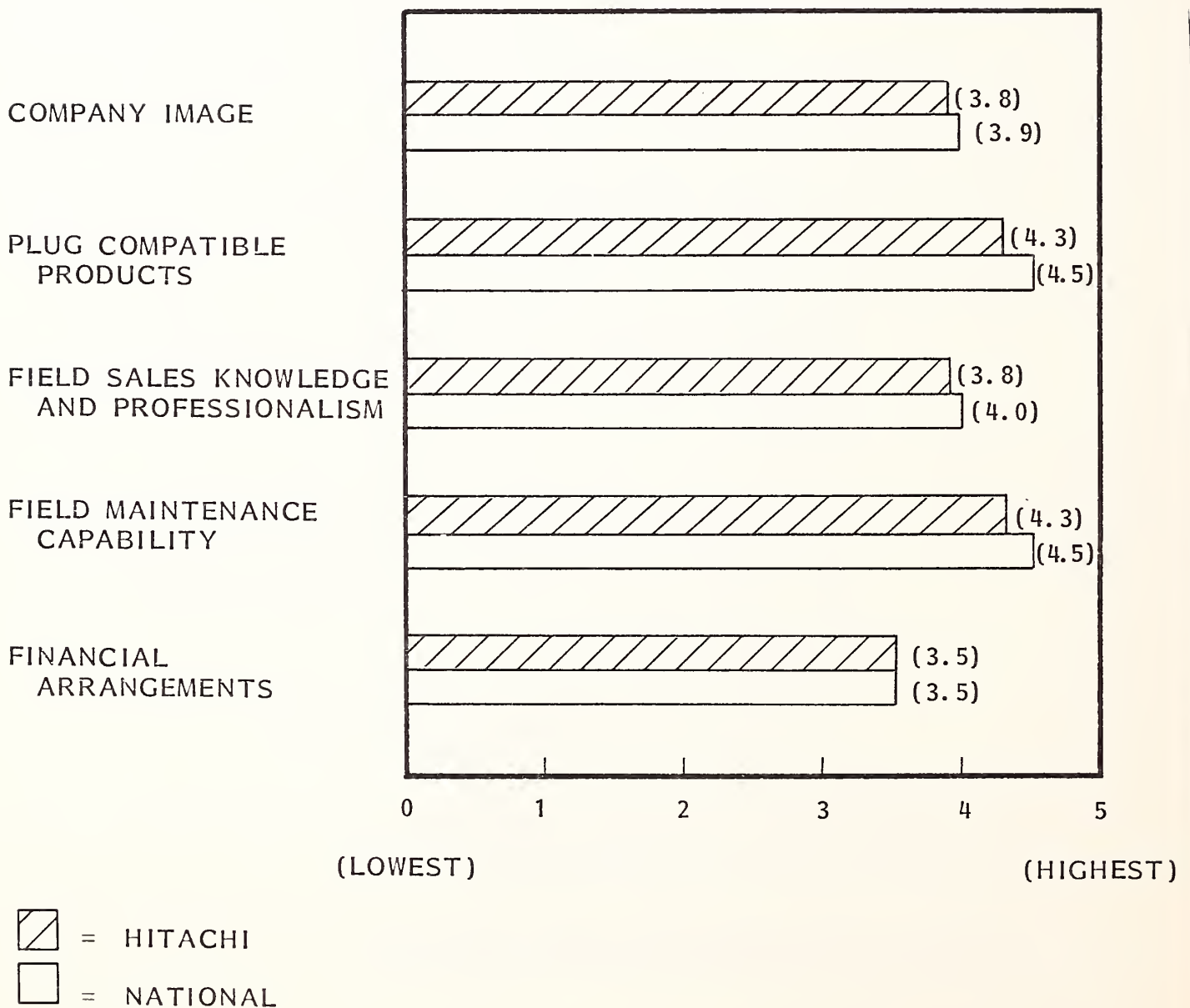
- . "Very informative and interesting, but lack of attention to specific issues or improvements."
- . "Vendor was constructive."
- . "Very pleased - good program."

## 18. USER RATINGS OF NAS

- As shown in Exhibit IV-4, NAS received high ratings overall. Users ranked NAS field maintenance capability highest, followed by plug compatible products.
  - High ratings from maintenance and plug compatible products were sometimes qualified:
    - . "Rating is based only on Hitachi machines." (5 rating on PC products)
    - . "Field maintenance is really good, but only because of Hitachi equipment. The rest is NAS equipment, and I'm not as impressed with it."
    - . "Outstanding reliability built into the AS/6, not the AS/5. We have only been down once. Three Hitachi people were flown from Japan. Very top notch and super professional people. We were very impressed."
    - . "NAS CPUs rate 5, peripherals get a 2 rating."
- Six companies did not rate NAS for financial arrangements because they had not dealt with NAS in the financial area yet.
- Respondents had difficulty rating company image.

# EXHIBIT IV-4

## RATING OF NATIONAL SEMICONDUCTOR'S ADVANCED SYSTEMS DIVISION AS PERCEIVED BY RESPONDENT USERS





- "They're a new organization - we have no real means of evaluation."
- "We really have had no dealings with NAS except in maintenance."
- "They're still trying to build their image."
- "NAS hasn't surfaced yet."

#### 19. RESPONDENT SUGGESTIONS FOR MARKETING OR TECHNICAL IMPROVEMENTS FOR THEIR PLUG COMPATIBLE VENDOR

- Users were very satisfied with NAS overall. Half (11 of 22) of the respondents either claimed that they had no suggestions for improvement, or re-emphasized their satisfaction.
  - Examples were:
    - "Have all your machines made in Japan."
    - "Overall - very satisfied with the company and their hardware."
    - "Their current approach is right: quality products at a good price."
    - "They're doing great as far as we're concerned. I can't imagine how they could do a better job. Just keep it up."
    - "PC vendors are offering real competition to IBM. I would encourage them to continue their efforts and to use aggressive marketing strategy. It will pay off."
    - "Keep offering, as they have in the past, an equal or better product for less money, and with faster delivery than IBM. They now lead or parallel IBM."

. "Vendors still in the ball game are OK."

● Software support was most often mentioned as an area of concern:

- "Would recommend overall improved software support. We have the staff for it but other users may not."
- "What is happening is that the software is becoming increasingly important. PC vendors need to convince us that they are more into operating systems software than they were in the past. We need that kind of confidence."
- "I'm very satisfied - the only area of criticism I have is software support. It's sporadic - sometimes it's excellent, but support people seem to be spread thin. The expertise is there - the availability isn't."
- "What NAS has to show us is the depth of the organization behind the field technical people to support the MVS user. We're switching from MVT to MVS on the 155 now, then will do the same on the AS/6. I'm satisfied with the field people I have, but have no feeling for the depth behind them."
- "Need additional hardware and software support."
- "The only weakness I can think of is that NAS doesn't have the speed in technical start-up with a new product that IBM does. It seems to take them longer. IBM is the true leader there."
- "They need to improve trouble-shooting diagnostics on hardware failures."
- Other suggestions made were:

- . "It is difficult to feel close to the company when people are scattered all over . . . Intel had a horrible problem maintaining consistency in its field service. NAS is making attempts to overcome this. At the local level it is fantastic, but it could be better at the regional level." (Respondent from a remote location)
- . "They should have more parts in remote areas. Would benefit from more written communication with fliers to customers and potential customers, as to what the AS/6 and 7000 developments are. We need direct communications on price increases, in addition to visits from the marketing person."
- . "Reduce cost and announce more products."
- . "NAS had better come out with a better product. They're not up to the level of Magnuson or IBM in equipment design. They have washed-out equipment." (With regards to AS/4 or AS/5 levels)
- . "Quality control! That was the principal problem when a national box was marketed by Intel. National rolled it out the door -then it was Intel's responsibility. NAS was already paid; didn't care about the rest. Now it's different."



## APPENDIX A: DEFINITIONS



## APPENDIX A:        DEFINITIONS

- "BIG TICKET ITEMS" - transactions of over \$100,000 per unit sold.
- CONFIRMED REPORT - information provided by a reliable source or by at least two sources, each independently of the other.
- EXECUTIVE COMMITTEE - a variation of the "President's Office" concept which forces certain important decisions to be made by a group of executives rather than the President alone. The major difference is that the President remains an individual person under the "Executive Committee" approach but loses personal identity under the approach called "Office of the President."
- EXECUTIVE RECRUITERS - personnel search consultants retained by corporations to locate key and scarce personnel.
- "HAWK" - the aborted attempt of Itel to emulate the IBM 303X level mainframe.
- "LIGHTNING" - the aborted National attempt to emulate the IBM 303X level system.
- MATRIX MANAGEMENT - a management organization system which provides for persons having a functional skill to report to more than one superior.



- NAS - "National Advanced Systems," a subsidiary of National Semiconductor Corporation.
- NATIONAL - National Semiconductor Corporation.
- PARENT COMPANY - National Semiconductor.
- PCM - Plug Compatible to IBM Mainframes.
- PCP - Plug Compatible to IBM Peripherals.
- "PLUG COMPATIBLES" OR "PC" - used generically to include the general market and supply of IBM plug compatible business, either PCM, PCP or both.
- P.O.S. - Point Of Sales equipment used for data entry at the location of transactions. Examples: terminal cash registers, wand readers, credit inquiry terminals, etc.
- PRODUCT MARKETING - Organization unit with objective to define products required to fill market needs. (Headed by Dick Whitcomb when Hitachi and Intel first worked together on the AS/6.)
- RELIABLE SOURCE - a person with access to accurate information who is known by the investigator to give reliable information or none at all.
- RUMOR - information received by "hearsay" (second party or more) which has not been confirmed by a reliable source.
- SYSTEM - CPU mainframe.
- SHARK - code name for medium-scaled systems under development by NAS, ranging from 1.3 to 3.6 MIPS.

- VION - a spin-off group from Itel, formerly the federal division in Washington, D.C.



APPENDIX B: TABULATION MATRIX OF KEY QUESTIONS  
FOR USERS OF HITACHI SYSTEMS



## EXHIBIT B-1

## SELECTED RESPONSES FROM USERS OF HITACHI MAINFRAMES

QUESTION NUMBER	QUESTIONNAIRE NUMBER										
	1	2	3	4	5	6	7	8	9	10	11
1 & 4 NAS CPU MODEL INSTALLED	AS/6	AS/5 AS 7000	AS/6	AS/6	AS/6	AS/6	AS/6	AS/6	AS/6	AS/6	AS/6
QUANTITY	1	2,1	1	1	1	1	1	1	1	1	1
2 WOULD YOU CONSIDER ANOTHER PCM?	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
5 DO YOU PURCHASE OR LEASE?	L	L	P	P	L	L	L	L	P	P	P
6 A. WILL YOU UPGRADE WITH NAS?	Y	Y	Y	Y	Y	Y	Y	Y	Y	DON'T KNOW	Y
6 B. DISK DRIVE MANUFACTURERS	CDC	ISS MEMO- REX,CDC	ISS IBM	MEMO- REX	HITACHI CDC STC	IBM	IBM CDC	ISS	IBM	IBM STC	HITACHI ISS
7 MAINTENANCE VENDOR	ITEL	NAS	NAS	NAS	NAS	ITEL	NAS	ITEL	NAS	NAS	NAS
RATING	4-5	4.9	4	5	4	5	3	4	5	4	4
8 RATING IMPORTANCE IN SELECTING A PCM VENDOR											
A. PRICE/ PERFORMANCE	5	5	5	5	4	5	4	5	5	4	3-4
B. HARDWARE MAINTENANCE	5	5	4	5	4	5	4	5	5	4	5
C. SOFTWARE SUPPORT	3	3	3	3	3	5	2	4	5	3	4
D. SINGLE VENDOR	2	3	1	1	4	1	5	3	2	2	2-3
E. VENDOR IMAGE	3	3.5	3	5	3	4	5	4	4	3	2
F. PRODUCT RELIABILITY	5	5	5	5	4	5	5	5	4	5	5
G. FINANCIAL ARRANGEMENTS	3	5	4	5	4	5	3	1	3	3	3
H. FIELD UP- GRADABILITY	4	4	5	3-4	3	5	5	3	4	4	5

## EXHIBIT B-1 (CONT.)

## SELECTED RESPONSES FROM USERS OF HITACHI MAINFRAMES

QUESTION NUMBER	QUESTIONNAIRE NUMBER										
	1	2	3	4	5	6	7	8	9	10	11
14 HAS A PCM SALESPERSON CALLED ON YOU IN THE LAST SIX MONTHS?	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
VENDOR											
AMDAHL	X	X	X	X				X	X		
MAGNUSON				X							
CDC	X	X	X	X							
NAS	X	X	X	X	X	X		X	X	X	X
15 A. LAST NAS VISIT	3/80	6/80	ON A REGULAR BASIS	1 TO 2 TIMES WEEKLY	ALL THE TIME	EVERY WEEK	—	WEEKLY	VERY FRE- QUENTLY	EVERY 3 WEEKS	EVERY 1 OR 2 WEEKS
15 B. RATING ON PROFESSIONALISM	3	4	4	5	4	5	—	WOULD NOT RATE	3	5	5
17 RATE NAS (DK = DON'T KNOW)											
A. COMPANY IMAGE	3	4	4	5	4	5	3	DK	3	3	4
B. PC PRODUCTS	4	4.5	5	5	4	5	3	DK	3	5	DK
C. FIELD SALES KNOWLEDGE	3	4	3.5	5	4	5	3	DK	2	4	4-5
D. FIELD MAINTENANCE CAPABILITY	4	4.5	3	5	4	5	4	4	5	4	4-5
E. FINANCIAL ARRANGEMENTS	DK	4	3.5	5	3	5	3	DK	1	3	4



## APPENDIX C: USER INTERVIEW QUESTIONNAIRE



AN ANALYSIS OF NATIONAL  
SEMICONDUCTOR'S ADVANCED SYSTEMS DIVISION

## USER QUESTIONNAIRE

- The objectives of this interview are to:
  - Profile current and future customers and prospects.
  - Determine the degree of customer satisfaction with NAS installed systems.
  - Determine users' plans for future purchases.
- 1. Do you currently have installed, or plan to install a computer system produced or marketed by Intel, Hitachi or National Semiconductor's Advanced Systems Division?
  - a) Yes ☐ Installed \_\_\_\_\_  
Plan to Install \_\_\_\_\_
  - b) No ☐ (on order)

(NOTE: If "No," advance to Question 19, but only if respondent previously had a NAS System, otherwise, terminate.)
- 2. If you have one of these PCMs installed, would you consider installing additional plug compatible mainframes?
  - ☐ Yes ☐ No
  - a) Why? (explanation)

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3. What do you see as deterrents to the purchase of large plug compatible mainframes?

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4. How many Intel, Hitachi or National computer systems does your company have installed and/or plan to install?

Model	Currently Installed		Additional or New Installations	
	Quantity	Installation Date(s)	Quantity	Installation Date(s)
a) AS/3000N or AS4				
b) AS/3000				
c) AS/5000 or AS5				
d) AS/7000N				
e) AS/7000 or AS 6				
f) AN/7000 DPC or AS7				

5. a) Have you purchased ☐ or leased ☐ systems?

b) If leased: Terms of lease: \_\_\_\_\_ months

Who carries paper: ☐ Intel ☐ 3rd party

☐ National ☐ Other

6. a) Will you upgrade your installed base to include future enhancements as announced by NAS?

☐ Yes ☐ No

b) Why? (comments concerning loyalty to vendor):

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c) Who manufactured the disk drives on your system?

☐ ISS

☐ Hitachi

☐ Don't Know

☐ Other

Comment on performance: \_\_\_\_\_

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INPUT

7.. Please indicate who performs maintenance on your system, and rate the overall quality of the service: (5 = outstanding, 1 = poor)

Product	Rating
a) CPU: Maintenance Vendor:	
b) CPU: Maintenance Vendor:	
c) CPU: Maintenance Vendor:	
d) CPU: Maintenance Vendor	

e) Comments:



8. Please rate the following factors as to their degree of importance in selecting a plug compatible mainframe vendor (5 = high, 1 = low), and rank "5"s: (Note to interviewer: Be sure to get the most important factor in selecting a mainframe vendor)

Factor	Rate	Rank 5s	Comment
a) Price/Performance			
b) Hardware Maintenance Capability of Vendor			
c) Software Support Capability			
d) Single Vendor for All System Purchases (CPU & Peripherals)			
e) Vendor Image/ Viability/Reputation in Field			
f) Product Reliability			
g) Financial Arrangements (terms and conditions)			
h) Field Upgradability			
i) Other (describe)			

- j) What does your NAS support person provide in the way of non-standard or extra information or hardware or software? (describe): \_\_\_\_\_

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9. a. Were you aware of Itel Systems marketing being taken over by National?

☐ Yes ☐ No

- b. Has there been any change in the level of service?

☐ Yes ☐ No

- c. If "Yes," explain: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. Who was involved in the final decision? (check all that apply)

- a) ☐ EDP Manager  
b) ☐ Corporate EDP Director  
c) ☐ Vice President of Data Processing  
d) ☐ President or Chairman  
e) ☐ Vice President of Finance, Administration, or Executive Vice President  
f) ☐ Committee Decision  
g) ☐ Board of Directors  
h) ☐ Other (describe)

\_\_\_\_\_  
\_\_\_\_\_

- i) ☐ Don't Know

11. Have you received any guarantee from your vendor concerning compatibility of the product with IBM?

a) Yes ☐

b) No ☐

c) From Intel ☐

d) From NAS ☐

e) Date \_\_\_\_\_

f) Describe: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

g) Has either Intel or NAS passed through the manufacturer's warranty from you directly to Hitachi?

☐ Yes ☐ No

12. Please describe any trade-in policies National is offering for old machines.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

13. What percentage price reduction do you require for purchasing or leasing IBM plug compatible mainframes or peripherals?

% Reduction	PCM	PCP
a) < 10%		
b) 10 - 20%		
c) 20 - 30%		
d) 30 - 40%		
e) 40 - 50%		
f) > 50%		

14. Have you had a plug compatible mainframe (PCM) salesman call on you in the last six months?

☐ Yes ☐ No

If "Yes," from which company?

\_\_\_\_\_

15. a) Have you been contacted by a salesperson from National Semiconductor's Advanced Systems Division?

☐ Yes ☐ No

If Yes, " what was the date? \_\_\_\_\_

- b) Rate his/her professionalism. (5 = highest, 1 = lowest): \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

16. Who in your company attended "CHACE" User Group at NCC?

Name: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

17. Rate National Semiconductor's Advanced Systems Division from your perception on the following factors: (5 = highest, 1 = lowest)

Factor	Rating	Rank 5s	Comments
a) Company Image			
b) Plug Compatible Products			
c) Field Sales Knowl- edge and Profes- sionalism			
d) Field Maintenance Capability			
e) Financial Arrange- ments (terms and conditions)			
f) Other			

- 18, What marketing or technical suggestions for improvement would you offer the vendor of your PCM?

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☐ No Comment

THANK YOU VERY MUCH!

(Completion of Interview with actual or planned NAS users)



## FOR NON-USERS OF NAS SYSTEMS

(If a former NAS or Itel user only)

19. Why did you dispose of your NAS/ITEL system?

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INPUT

20. Please provide the following information concerning IBM systems installed:

Product	Quantity	Storage (Megabytes)	Date Installed	Purchase (P) Rent(R) Lease (L)
a) 370/148				
b) 370/158				
c) 370/168				
d) 3031				
e) 3032				
f) 3033				

21. Would you ever consider purchasing a computer system produced or marketed by National Semiconductor's Advanced Systems Division?

☐ Yes ☐ No

If "Yes," please indicate below:

Model	Installations Considered	
	Quantity	Installation Date(s)
a) AS/3000N or AS4		
b) AS/3000		
c) AS/5000 or AS5		
d) AS/7000 or AS6		
e) AS/7000 or AS7		
f) Other		

- g) If "No," why not?

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22. Please rate the following factors as to their degree of importance in selecting a large plug compatible mainframe vendor (5 = high, 1 = low), and rank "5"s: (Note to interviewer: Be sure to get the most important factor in selecting a mainframe vendor)

Factor	Rate	Rank 5s	Comments
a) Price/Performance			
b) Hardware Maintenance Capability of Vendor			
c) Software Support Capability			
c) Single Vendor for All System Purchases (CPU & Peripherals)			
e) Vendor Image/ Viability/Reputation			
f) Product Reliability			
g) Financial Arrangements (terms and conditions)			
h) Field Upgradability			
i) Other (describe)			

23. What percentage price reduction do you require for purchasing or leasing IBM plug compatible mainframes or peripherals?

$\%$ Reduction	PCM	PCP
a) < 10%		
b) 10 - 20%		
c) 20 - 30%		
d) 30 - 40%		
e) 40 - 50%		
f) > 50%		

24. What sources of information do you use to locate and evaluate large system (370/148 or larger) PCM vendors?

- a) ☐ Magazine/Newspaper Stories
- b) ☐ Advertisements
- c) ☐ Industry Reports (Auerbach, Datapro, etc.)
- d) ☐ Trade Shows
- e) ☐ Other (describe)

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- f) ☐ None

INPUT

25. Have you been contacted by a salesperson from National Semiconductor's Advanced Systems Division?

☐

Yes

☐

No

If "Yes," what was the date? \_\_\_\_\_

26. Rate his/her professionalism. (5 = highest, 1 = lowest)

\_\_\_\_\_

27. Rate National Semiconductor's Advanced Systems Division from your perception on the following factors: (5 = highest, 1 = lowest)

Factor	Rating	Rank 5s	Comments
a) Company Image			
b) Plug Compatible Products			
c) Field Sales Knowledge and Professionalism			
d) Field Maintenance Capability			
e) Financial Arrangements (terms and conditions)			
f) Other			

28. What marketing or technical suggestions for improvement would you offer the vendors of your PCM?

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☐ No Comment

THANK YOU VERY MUCH!

INPUT





## APPENDIX D: LIST OF RESPONDENT COMPANIES



## APPENDIX D: LIST OF RESPONDENT COMPANIES

- Allergen Pharmaceuticals
- City of Dallas
- Ducommun
- City of Milwaukee
- Coast Community College District
- Copperweld Corporation
- Dallas County
- Dow Chemical Company
- Florida Power Corporation
- Iowa Department of Job Service
- Iowa State University
- Kansas Administration Department

- Life Insurance Company of Georgia
- Prince Georges County
- Rochester Telephone
- Salt Lake County
- State University of New York
- Texas Technical University
- United States Army
- United States Department of Justice
- University of Massachusetts
- Western Grocers





